this day shown any signs of life whatever, although seeds from the same packet, planted simultaneously under ordinary circumstances, are now well-grown young plants. After my first failure, I procured pure concentrated formic acid (sp. gr. 1·300) freshly made, and on repeating the experiments with it, other things being the same as in the former experiment, the result was again entirely negative. I then tried various other seeds, first soaking them in water for periods varying from five hours to three days before treating them with the acid, but all with no result. So far as I could judge, the only effect of the acid was to increase the density of the seed and to retard the growth, so much so that some of the seeds (common Lupinus), which under formic acid showed no signs of growth, as soon as they were thoroughly washed and placed under normal conditions began to germinate in the usual way. Since these experiments I have tried many different seeds and many different strengths, but have only so far succeeded in retarding their growth. I also attempted to inject the acid (1·5000) by means of a hypodermic syringe into the substance of growing seeds and bulbs, and in two instances I succeeded in killing a Begonia tuber and an Arum lily, and certainly none of the other plants treated showed the faintest symptom of increased vitality. W. R. M. Semple.

Hendford Park, Yeovil, April 11.

Rooks at Nesting Time.

Opposite my windows are lofty elms on which rooks have established themselves. In one tree there are three nests with sitting birds; a fourth nest, which was built this spring, has never been fully occupied, and a fifth is now in course of construction.

It is in relation to the last two nests that a singular fact is noticeable. A pair of rooks are apparently mated, flying off and returning together, and roosting at night on the same branch.

Both are engaged in building, but on different boughs; both select the same tree, almost, the same branch, for twigs, and both return home spray in beak. But while the hen bird flies to the incomplete nest (which she has built up, unaided, from the beginning, and is now three-fourths finished), the cock bird settles on the old nest, at the other side of the tree, and adds an upper story to an already capacious mansion.

How is this binary housekeeping or nest-building to be explained?

There have been further complications in the rookery since I wrote the foregoing a fortnight ago.

Then the situation was that a couple of rooks (apparently paired) were working together in collecting twigs; but while the hen bird carried hers to a new nest on the north side of an elm, the cock took his to an old nest on the south side.

Still they roosted and flew together, and behaved as engaged rooks should do, the cock now and then bringing a twig or two to the hen's nest, but chiefly working on his own.

In a few days the cock brought home another mate, and both birds set to work at the old nest. Although, for a day or two, appearances were still preserved, the original hen at last resented this trifling with her affections; she pecked at and drove off the cock, stole lining from his nest, and has since lived a life solitary and misanthropic. I see no sign of a new mate, but the hen sits by or on her own nest, and routs all new-comers who approach it.

On the same tree I have seen a singular case of wholesale burglary in which the sufferers are the new occupants of the old nest I have referred to, and the burglars a new pair of rooks. For a week they strove and failed to build a nest in an honest way, *i.e.* by breaking twigs from other trees; but they made no progress, the wind repeatedly blowing away the foundation during their absence in quest of materials.

One night, however, the wind dropped. The pair got up very early next morning, fell on the old nest (the tenants having gone off to feed), and by nine o'clock had three parts finished a new nest, on the north-west side, built entirely out of plunder from the old nest. To this they have since added a clumsy top story made of new materials.

One other curious fact, and I will take up no more of your space. On another elm a stray hen had persisted in thrusting her unwelcome attentions on an established pair now feeding their squabs. She had been there some days, and apparently was at last tolerated. One night, however, as many as ten desperate battles took place; the combatants falling, still locked in combat, from the topmost bough almost to the ground, and as often returning to the fray at the nest-side. This morning Aunt Caroline is *non est*, but I expect she will turn up again before long. Meanwhile, due perhaps to the extra food the young birds got by the exertions of the aunt, they are the largest and strongest in the rookery. F. E. Baines.

Leamington, April 28.

An Auroral Display on May 2.

On the evening of Saturday, May 2, at Filey (Yorkshire) I observed faint indications of an auroral display as early as 10 o'clock. On going out of the house at 11.10, five streaks of light were seen in the north, and a small cloud of light appeared on the horizon, which quickly rose and formed a perfect bow of light of great length and some 10° above the horizon at its highest point; by 11.15 all the streaks had disappeared. At 11.30, rapid beams of light were seen following the curve of the bow from west to east, each succeeded by straight arrow-like flashes above the bow in the opposite direction; 11.36, streaks again appeared on the eastern side; 11.39, the bow threw off clouds of light radially, first on the western, then on the eastern side; 11.42, the phenomena observed at 11.30 again set in on the western side; 11.49, the bow became very sharp towards the west and threw out streaks of light, while towards the east it became broken and flickering; 11.55, streamers appeared on the eastern side, and the bow became contracted on this side and smaller, striking the horizon at a higher angle; 11.58, the bow thickened and threw off radial clouds again; 12.1, a fine streamer appeared on the extreme eastern side; 12.3, the bow became very irregular, and for the first time the streamers appeared to start below the bow, three very sharp ones forming towards the east; 12.7, a second bow formed below the original one; 12.9, the bow broke up entirely towards the east into fine streamers, radial clouds of light being thrown off in the west; 12.20, bow became very indistinct in the west, and streamers gave place to clouds of light in the east; 12.22, streamers reappeared in the east; 12.25, arc of the bow reformed; 12.27, bow narrowed down and broke into two bows; 12.30, bow became irregular and sank down towards the horizon; 12.37, bow disappeared and faint streamers formed. After this a gradual fading set in, but the light was still visible though feeble at 1 a.m. The atmosphere had been exceptionally clear all through the day. A. E. M.

Felsted School, Essex.

Daylight Meteor, April 12.

The meteor referred to in Nature of April 23 (p. 581), was seen by me in Glasgow, low down on the S.E. horizon, at 8.5 p.m. The position of its visible path was carefully noted at the time in relation to a church spire, which it just seemed to touch. On April 27, at 10.30 p.m. the centre of the full moon was 2° above this point, its declination was therefore 22° 13′ S., and its R.A. on April 12 at 8.5 p.m. was 10h. 39m. On account of some intervening shrubs the meteor's path was only visible over a distance of 10°, but the declination seemed to remain unchanged. C. E. Stromeyer.

Glasgow, May 2.

THE ROYAL SOCIETY SELECTED CANDIDATES.

The following are the names and qualifications of the fifteen candidates recommended by the Council of the Royal Society for election this year:—

Sir George Sydenham Clarke,

Major, R.E., K.C.M.G., Secretary to the Colonial Defence Committee and Associate Member of the Ordnance Committee. Late Secretary to the Royal Commission on Administration of the Naval and Military Services. Examiner to the Science and Art Department and the Military Education Department. Formerly (from 1871 to 1880) Instructor in Geometrical Drawing in the Royal Engineering College, Cooper's Hill. Joint Author of paper "On some Figures Exhibiting the Motion of Vibrating Bodies, and on a New Method for Determining the Speed of Machines" (*Proc. Roy. Soc.*, vol. xxvi., pp. 157–163), and of a paper "On the Determination of the Rate of Vibration of Tuning Forks" (*Phil. Trans.*, 1880, pp. 1–14). Author of

"Practical Geometry and Engineering Drawing" (1875); "Principles of Graphic Statics" (1879); "Perspective Explained and Illustrated" (1884); "Plevna: a Study of the Operations of 1877" (1880); "Official Report on the Effects of the Bombardment of Alexandria" (1882); "Fortification: Past, Present, and Future" (1890); and of a large number of papers on naval and military subjects.

J. NORMAN COLLIE,

Ph.D., Assistant Professor of Chemistry, University College, London. Distinguished as a worker in Organic Chemistry. Author of numerous papers published during the period from 1881 to the present time in the *Proceedings* and *Transactions* of the Royal Society of Edinburgh, *Liebig's Annalen*, the *Berichte* of the German Chemical Society, and the *Transactions* of the Chemical Society. His earlier papers relate chiefly to the study of phosphonium and phosphine derivatives and allied ammonium compounds, their behaviour when decomposed by heat having been thoroughly studied by him. Of late years he has made important contributions to our knowledge of dehydracetic acid, having described a number of very remarkable "condensations," whereby it is converted into pyridine, orcinol and naphthalene derivatives.

ARTHUR MATTHEW WELD DOWNING,

M.A., D.Sc., Vice-President of the Royal Astronomical Society. President of the British Astronomical Association. Superintendent of the *Nautical Almanac*. Author of the following papers, among many others, which have appeared in the *Monthly Notices* of the Royal Astronomical Society:—"Proper Motions of Certain Stars in the Greenwich Seven Year Catalogue for 1864" (vol. xxxviii., p. 514); "On the N.P.D.'s of the Greenwich Seven Year Catalogue for 1860" (vol. xl., p. 85); "The Greenwich Standard Right Ascensions" (vol. xl., p. 162); "The Possible Ten-month Period of Variation in Latitude" (vol. xl., p. 430); "On the N.P.D.'s of the Cape Catalogue for 1880, and on the Greenwich and Cape Mean Systems of North Polar Distances" (vol. xlii., p. 20); "Discussion of the Observations of γ Draconis, made with the Greenwich Reflex Zenith Tube, during the years 1857–75" (vol. xlii., p. 326); "On the relative Motion of the Components of p Eridani" (vol. xliii., p. 263); "On the Orbit of γ Coronæ Australis" (vol. xliii., p. 368); "On the Periodic Time of α Centauri" (vol. xlv., p. 151); "A Comparison of the Star Places of the Argentine General Catalogue for 1875 with those of the Cape Catalogue, 1880" (vol. xlvii., p. 446); "Positions for 1750 and Proper Motions of 154 Stars, S. of −29° dec., from a revision of Powalky's Reduction of the Star Places of Lacaille's Astronomiæ Fundamenta" (vol. xlviii., p. 322); "Discussion of Washington Observations of the Sun, 1875–83" (vol. xlix., p. 431); "Corrections to the Orbit of Juno" (vol. l., p. 487); "The Orbit of Flora, with corrections to Brünnow's Tafeln der Flora" (vol. lii., p. 585).

FRANCIS ELGAR,

LL.D., F.R.S.E., Naval Architect and Engineer, Professor of Naval Architecture and Marine Engineering in the University of Glasgow, and Director of Her Majesty's Dockyards. Prof. Elgar has advanced the science of naval architecture by original investigations, notably in the departments of stability and of the structural strength of ships. These are described in papers communicated to the Royal Society, one of which is printed *in extenso* in *Roy. Soc. Proc.* No. 232, 1884. An abstract of the other was read before the Society on January 14, 1886. The first describes an important and novel principle which determines the variation of stability with draught of water, and the second greatly advances the investigation of the straining actions upon ships at sea. Prof. Elgar is distinguished for his acquaintance with the theory and practice of Naval Architecture, and was unanimously elected on that account by the Court of Glasgow University to the "John Elder" Chair of Naval Architectural and Marine Engineering. He is eminently distinguished as a Naval Architect and Engineer, being a Fellow of the late Royal Society of Naval Architecture and Marine Engineering, and Member of Council of the Institution of Naval Architects, Member of Council of the Institute of Engineers and Shipbuilders in Scotland, and Member of the Institution of Civil Engineers. He was appointed in January 1884 by the Council of the Institution of Naval Architects to sit as their representative upon the Committee formed by the President of the Board of Trade to frame rules for regulating the load lines of ships.

Supplementary Certificate.—Is now a representative of the Institution of Naval Architects upon the Technical Committee of Lloyd's Register of British and Foreign Shipping. Was Vice-President of the International Jury in the class of *Matériel de Navigation et Sauvetage*, in the Paris Exhibition, 1889. Is the Consulting Naval Architect for the Cunard Steamers *Campania* and *Lucania*, which are the most powerful and, with the exception of the *Great Eastern*, the largest ships ever built.

ANDREW GRAY,

M.A. (Glasgow), F.R.S.E, Professor of Physics, University College of North Wales. Examiner in Mathematics for degrees in the University of Glasgow. For five years Private Assistant and Secretary to Sir W. Thomson (Lord Kelvin); for four years Official Assistant to the Professor of Natural Philosophy in the University of Glasgow; and for the last nine years in his present post. Distinguished for his acquaintance with theoretical and experimental physics. Author of the following scientific works and papers:—"Absolute Measurements in Electricity and Magnetism" (1889); "Theory and Practice of Absolute Measurements in Electricity and Magnetism" (vol. i., 1888; vol. ii., in two parts, 1893); "A Treatise on Magnetism and Electricity," shortly to be published; "On the Determination in Absolute Units of the Intensity of Powerful Magnetic Fields" (*Phil. Mag.*, 1883); "On the Dynamical Theory of Electro-magnetic Action" (*ibid.*, 1890); "On the Calculation of the Induction Coefficients of Coils" (*ibid.*, 1892); "On a New Reflecting Galvanometer of great sensibility, and on New Forms of Astatic Galvanometers," jointly with T. Gray (*Proc. Roy. Soc.*, 1884); "On the Relation between the Electrical Qualities and the Chemical Composition of Glass and Allied Substances," Part I., jointly with T. Gray and J. J. Dobbie (*Proc. Roy. Soc.*, 1884) "On the Electro-magnetic Theory of the Rotation of the Plane of Polarised Light" (*Rept. Brit. Assoc.*, 1891).

GEORGE JENNINGS HINDE,

Ph.D. (Munich), F.G.S. Studied at University College, Toronto, Canada (1874–75); afterwards (1879–80) studied, under Dr. Karl Zittel, in the University of Munich, where he graduated. Author of numerous papers on Geology and Palæontology, viz.:—"The Glacial and Interglacial Strata of Scarboro' Heights and other localities near Toronto, Ontario" (*Canad. Journ.*, 1877, pp. 28, one plate); "On Conodonts from the Cambro-Silurian and Devonian of Canada and the United States" (*Quart. Journ. Geol. Soc.*, vol. xxxv., pp. 351–369, pl. xv.–xviii., 1879); "On Annelid Jaws from the Cambro-Silurian and Devonian of Canada and the Lower Carboniferous of Scotland (*op. cit.*, vol. xxxv., pp. 370–389, pl. xviii.–xx., 1879); "On a New Genus of Favosite Coral from the Upper Silurian, Manitoulin Island, Lake Huron" (*Geol. Mag.*, 1879, pp. 244–246); "Fossil Sponge Spicules from the Upper Chalk, Horstead, Norfolk" (*Inaug. Dissert.*, Munich, 1880, 8vo, pp. 84, 5 plates); "On Annelid Jaws from Wenlock and Ludlow formations of the West of England" (*Quart. Journ. Geol. Soc.*, vol. xxxvi., pp. 368–378, pl. xiv., 1880); "Notes on Fossil *Calcispongiæ* with Descriptions of New Species" (*Ann. and Mag. Nat. Hist.*, ser. 5, vol. x., pp. 185–205, pl. x.–xii., 1882); "On Annelid Remains from the Silurian Strata of the Island of Gotland" (*Bihang till K. Svenska Vet. Akad. Handl.*, Bd. vii. No. 5, pp. 28, 3 plates, 8vo, Stockh., 1882); "Catalogue of the Fossil Sponges in the British Museum (Nat. Hist.) with Descriptions of New and little-known Species" (4to, pp. 248, 38 plates, 1883); "On some Fossil *Calcispongiæ* from the Well-boring at Richmond, Surrey" (*Quart. Journ. Geol. Soc.*, vol. xl., pp. 778–783, 1 plate, 1884); "On the Structure and Affinities of the *Receptaculitidæ*," &c. (*op. cit.*, vol. xl., pp. 795–849, pl. xxxvi.–xxxvii., 1884); "On a New Species of Crinoid with Articulating Spines" (*Ann and Mag. Nat. Hist.*, ser. 5, vol. xv., pp. 157–173, pl. vi., 1885); "On Beds of Sponge Remains in the Lower and Upper Greensands of the South of England" (*Phil. Trans.*, 1885, vol. clxxvi., p. 51, pl. xl.–xlv.)

Supplementary Certificate.—"A Monograph of the British Fossil Sponges" (Palæontographical Soc., Part I., 1887, pp. 1–92, pl. i.–viii.; Part II., 1888, pp. 93–188, pl. ix.; Part III., 1893, pp. 189–254, pl. x.–xix.); "On the Cherts and Siliceous Schists of the Permo-Carboniferous of Spitzbergen" (*Geol. Mag.*, 1888, pp. 241–251, 1 pl.); "On some New species of *Uruguaya* (Carter), with Remarks on the Genus" (*Ann. and Mag. Nat. Hist.*, ser. 6, vol. ii., 1888, pp. 1–12, 1 pl.); "On a True

Deuconid Calcisponge from the Middle Lias of Northamptonshire" (*ibid.*, vol. iv., 1889, pp. 325–358, 1 pl.); "On Archæocyathus, Billings, and on other Genera allied to it, from Cambrian Strata, &c." (*Quart. Journ. Geol. Soc.*, vol. xlv., 1889, pp. 125–148, 1 pl.); "Notes on Radiolaria from the Lower Palæozoic Rocks of the South of Scotland" (*Ann. and Mag. Nat. Hist.*, ser. 6, vol. vi., 1890, pp. 40–59, 2 pl.); "On the Sponge Remains in the Tertiary Strata, near Oamaru, New Zealand" (in conjunction with Mr. W. M. Holmes), (*Linn. Soc. Journ. Zool.*, vol. xxiv., 1891, pp. 177–262, with 9 pl.); "Note on a Radiolarian Rock from Fanny Bay, Port Darwin, Australia" (*Quart. Journ. Geol. Soc.*, vol. xlix., 1893, pp. 221–226, 1 pl.). Has paid special attention to the microscopic structure of Siliceous Deposits and Cherts, and has demonstrated the existence of Sponges, Radiolaria, and other organisms in them, and as largely composing such deposits, of all ages, and from the most distant parts of the world.

HENRY ALEXANDER MIERS,

M.A. (Oxon), F.G.S., F.C.S., Assistant in the Department of Minerals, British Museum (Nat. Hist.). Has improved the Adams instrument for the measurement of optic axal angles; devised a form of goniometer for measuring the angles of growing crystals; and a stage-goniometer for use with the microscope. Distinguished as a mineralogist and crystallographer, and author of important investigations in crystallography and mineralogy, 1882–94, as under:—"Cerussit von La Croix" (*Zeitsch. für Krystall.*, vi.); "The Crystalline Form of Meneghinite" (*Mineral. Mag.*, v.); "Hemihedrism of Cuprite" (*Phil. Mag.*, xviii.); "Monagite from Cornwall and Connellite" (*Mineral. Mag.*, vi.); "Crystallography of Bromostrychnine" (*Journ. Chem. Soc.*, xlvii.); "Crystallography of Tricupric Sulphate" (*ibid.*); "Orthoclase from Kilima-n-jaro and Adrelavia, Switzerland" (*Mineral. Mag.*, vii.); "New Cornish Mineral" (*Mineral. Mag.*, vii.); "Zonenformal für Orthogonate Systeme" *Zeitsch. für Krystall.*, xii.); "Crystals for Baric Slag" (*Journ. Chem. Soc.*, li.); "Use of Gnomonic Projection" (*Mineral. Mag.*, vii.); "Calcites, Egremont, Cumberland" (*ibid.*, viii.); "Pyrargyrite and Proustite" (*ibid.*, viii.); "Mineralogical Notes—Polybasite, Aikinite, Quartz, Cuprite, and Locality of Turnerite" (*ibid.*); "Stephanite and Kaolinite" (*ibid.*, ix.); "Sanguinite (new mineral), Krennerite" (*ibid.*); "Ullmannite Tetartohedrism" (*ibid.*); "Student's Goniometer" (*ibid.*); "Orpiment" (*ibid.*, x.); "Cornwall Danalite" (with G. T. Prior, *ibid.*); (with W. J. Pope) "Mittheil. aus dem Krystall Laboratorium des City and Guilds of London Inst." (*Zeitsch. für Krystall.*, xx.); "Spangolite from Cornwall (*Neues Jahresbr. für Min.*, ii.); "Quartz from North Carolina" (*Amer. Journ. Sci.*, xlvi.); "Xanthocanite," &c. (*Mineral. Mag.*, x.); "Spangolite" (*ibid.*, x.); "On a New Method of Measuring Crystals," &c. (*Rept. Brit. Assoc.*, NATURE, l.).

FREDERICK WALKER MOTT,

M.D. (Lond.), F.R.C.P. Lecturer on Physiology, Charing Cross Hospital. Distinguished as a physiologist. The following are his most important published papers:—"Bacteria, or their Antecedents, in Healthy Tissues" (with Prof. Horsley—*Journ. of Physiol.*, 1883); "Myxofibroma of Spinal Cord" (*Brain*, 1888); "Cardio-vascular Nutrition and its relation to Sudden Death" (*Practitioner*, 1888); "Pathology of Pernicious Anæmia" (*ibid.*, 1890); "Clarke's Column in Man, Monkey, and Dog" (*Journ. of Anat. and Physiol.*, 1887); "On Eye Movements produced by Cortical Faradisation of the Monkey's Brain" (with Prof. Schäfer—*Brain*, 1890, and Internat. Med. Congress, Berlin); "On Movements resulting from Excitation of the Corpus Callosum in Monkeys" (with Prof. Schäfer—*Brain*, 1891); "Complete Sclerosis of Golt's Column" (*Internat. Journ. of Med. Sci.*, 1891); "The Results of Hemisection of the Spinal Cord in Monkeys" (*Phil. Trans.*, 1892).

Supplementary Certificate.—Physiologist and Neurologist. Secretary of the Neurological Society. Pathologist to the London County Council Asylums. Has published the following papers recently:—"The Bipolar Cells of the Spinal Cord and their Connections" (*Brain*, 1891); "Ascending Degenerations of the Spinal Cord" (*ibid.*, 1892); Article on "Pernicious Anæmia" ("Quain's Dict. of Med.," 2nd edit.); "A Case of Multiple Infective Neuritis" (*Clin. Soc. Trans.*); "A Case of Amystrophic Lateral Sclerosis with Degeneration of the Motor Path from the Cortex to the Periphery" (*Brain*, 1895); "Experimental Enquiry upon the Afferent Tracts of the Central Nervous System" (*ibid.*, 1895); "The Sensori-Motor Functions of the Central Convolutions of the Cerebral Cortex" (*Journ. Physiol.*, 1894); "Experiments upon the Influence of Sensory Nerve upon Movement and Nutrition of the Limbs" (Preliminary Communication, with Prof. Sherrington, F.R.S.) (*Proc. Roy. Soc.*, vol. lvii.).

JOHN MURRAY,

Ph.D. (Jena)., LL.D. (Edin.), D.Sc. (Camb.). One of the Naturalists on board the *Challenger*, 1872–76. First Assistant on the *Challenger* Editorial Staff, 1876–82. Editor and Director of the *Challenger* publications, 1882–95. Editor of the Reports on the Scientific Results of H.M.S. *Challenger;* joint Author of the Narrative of the Cruise of the *Challenger*, and of the Report on Deep-Sea Deposits; Author of a Summary of the Scientific Results of the *Challenger* Expedition; Author of numerous Papers dealing with Oceanography, Physical Geography, and Marine Biology.

KARL PEARSON,

M.A., LL.B., late Fellow of King's College, Cambridge. Professor of Mathematics and Mechanics at University College, London. Editor and joint Author of vol. i. of Todhunter's "History of Elasticity." Author of the following papers on Elasticity:—"On the Distortion of a Solid Elastic Sphere" (*Quart. Journ. Math.*, vol. xvi.); "On Twists in an Infinite Elastic Medium" (*Mess. of Math.*, vol. xiii.); "On the Flexure of Heavy Beams" (*Quart. Journ. Math.*, vol. xxiv.); "On the Generalised Equations of Elasticity, and their Application to the Wave Theory of Light" (*Proc. Lond. Math. Soc.*, vol. xx.); "On Energy in an Elastic Solid" (*Mess. of Math.*, 1889); "On Wöhler's Experiments on Alternating Stress" (*ibid.*, 1890): also "Contributions to the Mathematical Theory of Evolution" (*Phil. Trans.*, 1894).

THOMAS ROSCOE REDE STEBBING,

M.A. (Oxon.), B.A. (Lond.). Clerk in Holy Orders. Late Fellow and Tutor of Worcester College. Author of Report on the Amphipoda collected by H.M.S. *Challenger*, a task which has occupied him almost exclusively for six years. It forms three large volumes (vol. xxix. of the Report), and consists of 1774 pages, and 212 plates, with a map, 4to, 1888. (The figures were all drawn by the author.) Also author of the following:—"Note on *Calceola sandalina*, Lmk." (*Geol. Mag.*, vol. x., pp. 57–61, pl. v., 1873); "A New Species of Sessile-eyed Crustaceans" (*Ann. and Mag. Nat. Hist.*, ser. 4, vol. xvii., pp. 73–80, pl. iv.–v., 1876); "Amphipodous Crustaceans (*Hyale, Aronyx, &c.*)" (*ibid.*, pp. 337–346, pl. xviii.–xix., 1876); "Some New and little-known Amphipodous Crustaceans" (*ibid.*, vol. xviii., pp. 443–449, pls. xix.–xx., 1876); "On Sessile-eyed Crustaceans" (*ibid.*, ser. 5, vol. 1., pp. 31–37, pl. v., 1878); "On Species of Amphipodous Crustaceans" (*ibid.*, vol. 11., pp. 464–370, pl. xv., 1878); "The Sessile-eyed Crustaceans of Devonshire" (*Trans. Devon. Assoc.*, vol. xi., pp. 516–524, 1879); "On *Gastrosaccus spinifer*" (*Ann. and Mag. Nat. Hist.*, ser. 5, vol. vi., pp. 114–118, pl. iii., and p. 328, 1880); "A New English Amphipodous Crustacean" (*ibid.*, vol. xv., pp. 58–62, pl. ii., 1885); "On the Crustacea Isopoda of the *Lightning*, *Porcupine*, and *Valorous* Expeditions" (joint paper with the Rev. A. M. Norman, *Trans. Zool. Soc.*, 1886, vol. xii., pp. 77–142, pls. xvi.–xxvii.); "Exotic Amphipoda from Singapore and New Zealand" (*ibid.*, vol. xii., pp. 199–220, pls. xxxviii.–ix.); Address as President of Devonshire Assoc. (*Trans. Devon. Assoc.*, 1884).

Supplementary Certificate.—Author of "The Naturalist of Cumbræ; being the Life of David Robertson, F.L.S., F.G.S., by his Friend" (1891)" "The right Generic Names of some Amphipoda" (*Ann. and Mag. Nat. Hist.*, 1890); "Sessile-eyed Crustaceans" (*ibid.*, pl. xv.–xvi., 1891); "On the genus *Urothœ* and a new genus *Urothoides*" (*Trans. Zool. Soc.*, pl. i.–iv., 1891); "A History of Crustacea" and "Recent Malacostraceæ" (1893); "A New Pedunculated Cirripede" (*Ann. and Mag. Nat. Hist.*, pl. xv., 1894); "The Amphipoda collected during the Voyages of the *Willem Barents* in the Arctic Seas in the Years 1880–84" (*Soc. Nat. Art. Mag.*, Amsterdam, 1894, pl. i.–vii.); "On the Amphipoda of the *Buccaneer*" (*Zool. Soc. Trans.*, 1895, pls. i.–iv.); "Notes on Crustacea"

(*Ann. and Mag. Nat. Hist.*, pl. ii., 1895); "On Four New British Amphipoda (Stebbing and Robertson, *Zool. Soc. Trans.*, vol. xiii., pl. v.-vi., 1891).

Charles Stewart,

M.R.C.S., President of the Linnean Society. Conservator of the Museum of the Royal College of Surgeons, and Hunterian Professor of Human and Comparative Anatomy. Late lecturer on Comparative Anatomy, and joint lecturer on Physiology at St. Thomas's Hospital. Distinguished as a Biologist. Author of the following papers:—"On the Structure and Cause of Colour in the Nacreous Layer of Shells" (*Devon. Assoc. Trans.*, 1864); "On the Spicula of the Regular Echinoidea" (*Trans. Linn. Soc.*, 1865); "On a New Sponge, *Tethyopsis columnifer*" (*Quart. Journ. Micros. Sci.*, 1870); "On the Minute Structure of certain Hard Parts of the genus Cidaris" (*ibid.*, 1871): "Note on the Scalp of a Negro" (*Monthly Micros. Journ.*, 1873); "Note on the Calcareous Parts of the Sucking Feet of an Echinus, *Podophora atrata*" (*ibid.*, 1873); "Notes on *Bucephalus polymorphus*" (*ibid.*, 1875); "On the Lachrymal Gland of the Common Turtle (*ibid.*, 1877); "On a New Coral, *Stylaster stellulatus*, and Note on *Tubipora musica*" (*ibid.*, 1878); Note on an Abnormal *Amblypneustes griseus*" (*Journ. Linn. Soc.*, 1880); "On certain Organs of the Cidaridæ" (*Linn. Soc. Trans.*, 1877); "On Some Structural Features of *Echinostrephus molare*, *Parasalenia gratiosa*, and *Stomopneustes variolaris*" (*Journ. Roy. Micros. Soc.*, 1880); "On a Supposed New Boring Annelid" (*ibid.*, 1881); "On a Hermaphrodite Trout, *Salmo fario*" (*Journ. Linn. Soc.*, 1891); "On a Hermaphrodite Mackerel, *Scomber scomber*" (*ibid.*, 1891); "On Some Points in the Anatomy of *Heloderma*" (*Proc. Zool. Soc.*, 1891); "On a Specimen of the True Teeth of *Ornithorhynchus*" (*Quart. Journ. Micros. Sci.*, 1891).

Supplementary Certificate.—Fullerian Professor of Physiology in the Royal Institution.

William E. Wilson,

A gentleman who has devoted himself to astronomical research. In December 1870, he was engaged on the Total Solar Eclipse Expedition to Oran. In 1872 he built an astronomical observatory at Daramona and equipped it with a 12″ reflector by Grubb. In 1881 he built a new observatory and equipped it with a 24″ reflector by Grubb. In 1891 this was remounted and provided with electric control for stellar photography. Author of "A Method of recording the Transits of Stars by Photography" (Roy. Astron. Soc., 1889); "A New Photographic Photometer for Determining the Magnitudes" (*ibid.*, 1892); "On the Radiation of Heat from Sun Spots" (*Proc. Roy. Soc.*, vol. lv.); "The Absorption of Heat in the Solar Atmosphere" (*Proc. Roy. Irish Acad.*, 1892), in conjunction with Prof. Rambaut; "Experimental Investigations on the Effective Radiation from the Sun" (*Phil. Trans.*, 1894), in conjunction with Mr. P. L. Gray; "On the Temperature of the Carbons in the Electric Arc" (*Proc. Roy. Soc.*, 1892), in conjunction with Mr. P. L. Gray.

Supplementary Certificate.—In addition to the qualifications already set forth the following may be mentioned:—(1) Mr. Wilson has undertaken to carry out Experiments on Solar Radiation for the Committee of the British Association; (2) he has written a paper entitled "The Thermal Radiation from Sun Spots" (*Monthly Notices R.A.S.*, vol. lv., No. 8); (3) he has also written on "The Effect of Pressure of the surrounding Gas on the Temperature of the Crater of the Electric Arc" (*Proc. Roy. Soc.*, vol. lviii.).

Horace Bolingbroke Woodward,

F.G.S., Geologist on the Geological Survey of England and Wales. Hon. Mem. Norfolk Nat. Soc. and Yorksh. Phil. Soc. Awarded the Murchison Fund by the Council of the Geological Society in 1885. On the staff of the Geological Survey since 1867, and author of the following memoirs:—"Geology of East Somerset and Bristol Coalfields" (1876); "Geology of the Country around Norwich" (1881); "Geology of the Country around Fakenham, &c." (1884); and of parts of five other memoirs; also of parts of sixteen sheets of the map, and of nine sheets of sections. Author of "The Geology of England and Wales" (1876 and 1887); of two papers in *Quart. Journ. Geol. Soc.* (1876, 1886); nine papers, &c., in *Proc. Geol. Assoc.* (1875–1889); of two Presidential Addresses to the Norwich Geol. Soc. (1879, 1880); of eleven other papers published by Norfolk and Somersetshire Societies (1874–1887); of nine papers in the *Geological Magazine;* of Reports on Coast Erosion (Brit. Assoc., 1885, 1889); and of Reports on Pliocene and Post Pliocene Beds to the British Sub-Committee of the International Geological Congress (1882, 1888).

Supplementary Certificate.—Since the above certificate was sent in, Mr. Woodward has been President of the Geologists' Association and of the Norfolk Naturalists' Society. He has also published various papers and memoirs, including the following:—"Formation of Landscape Marble" (*Geol. Mag.*, 1892); "Geological Zones" (*Proc. Geol. Assoc.*, 1892); "Oolitic Iron Ore in Raasay" (*Geol. Mag.*, 1893); "Memoir on the Lias of England" (Geological Survey, 1893).

William Palmer Wynne,

D.Sc. (Lond.), Assistant Professor of Chemistry in the Royal College of Science, South Kensington. Distinguished for his zeal and ability as an organic chemist. Author of "Action of Sulphuryl Chloride on Acetorthotoluidide and Acetoparatoluidide, Mono-, Di-, and Tri-chlorotoluenesulphonic Acids," and "Note on the Constitution of Nevile and Winther's Orthotoluidenesulphonic Acid and of the Sulphonic Acids of Orthochlorotoluene and Orthobromotoluene" (*Trans. Chem. Soc.*, 1892). Joint Author with Prof. Japp of "Action of Aldehydes and Ammonia on Benzil" (*Trans. Chem. Soc.*, 1886). Joint Author with Prof. Armstrong of twenty-four papers in the *Proc. Chem. Soc.* from 1886–93 on Naphthalene and its Derivatives.

Supplementary Certificate.—Has submitted to the Chemical Society since 1893 papers on the Disulphonic Acids of Toluene and of Ortho- and Para-chlorotoluene (in conjunction with Mr. James Bruce); on the Six Dichlorotoluenes and their Sulphonic Acids (in conjunction with Mr. Alfred Greeves); and eleven communications on Naphthalene Derivatives (in conjunction with Dr. Armstrong). In their communications on Naphthalene (thirty-nine in all) made to the Chemical Society during the past ten years, Drs. Armstrong and Wynne have revised practically the whole of the Chemistry of Naphthalene in so far as relates to the formation of its Chlorinated and Sulphonated Derivatives, and, besides describing many new Derivatives, have placed beyond question the structure of the ten Di- and fourteen Tri-Chloronaphthalenes to which respectively all other Di- and Tri-Derivatives may be referred.

ON LIPPMANN'S COLOUR PHOTOGRAPHY WITH OBLIQUELY INCIDENT LIGHT.

IN the discussion which followed Prof. Lippmann's splendidly interesting communication to the Royal Society (April 23), on colour photography, I suggested the possibility of applying his method to the Röntgen X-light; but at the same time remarked that it might be found impracticable on account of the smallness of the specular reflection of the X-light from polished surfaces, unless at obliquities little short of 90°. Lord Blythswood's experiments, communicated to the Royal Society on March 19, seemed to prove decisively something of true specular reflection of X-light, incident on a plane mirror of speculum metal at 45°. Experiments, which he has since made by means of a concave mirror of speculum metal, have demonstrated beyond all doubt that there is regular reflection at nearly normal incidence; but they have also proved that the amount of regularly reflected light is exceedingly small in proportion to diffuse light caused to emanate from the mirror, by the incidence of X-light upon it. Experiments by Joly, of Dublin, have, I believe, proved somewhat abundant specular reflection of the X-light, at incidences little short of 90°, on surfaces of bodies transparent to ordinary light. And the extremely small refractivity of the photographic gelatine film for X-light, will allow incidences little short of 90° upon the metal mirror, to be used instead of the normal incidences which Prof. Lippmann has hitherto used. But for very oblique incidences the mercury mirror, with its surface fitted to